Jeremy Johnson

STATE OF MISSOURI

Bob Holden, Governor • Stephen M. Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

April 6, 2004

CERTIFIED MAIL – 7003 0500 0002 3723 9588
RETURN RECEIPT REQUESTED

Mr. Joseph Haake
Group Manager
The Boeing Company
Dept. 464C, Bldg. 220
Mail Code S221-1400
P.O. Box 516
St. Louis, MO 63166-0516

RE: Comments Concerning the Boeing Resource Conservation and Recovery Act Facility Investigation (RFI) Report, Hazelwood, Missouri, Permit# MOD00818963

Dear Mr. Haake:

The Missouri Department of Natural Resources' Hazardous Waste Program (HWP) in conjunction with the Geological Survey and Resource Assessment Division (GSRAD) has completed review of the RFI Report dated October 22, 2003. The following comments must be addressed in a revised RFI Report.

GENERAL COMMENT

The comments contained in this letter apply to the RFI Report and the characterization of contamination identified at the facility. The Boeing facility is currently involved as a pilot project in the development of Missouri's Risk-Based Decision Making Process. It has been decided to base the need for further investigation at the site on the results of the risk assessment that is currently under review by the department. The risk determinations for specific areas at the facility will help guide decisions regarding the need for further investigation of areas noted as potentially needing such investigation as outlined in this letter. If areas identified in this letter appear to pose an unacceptable risk, further characterization may be completed as part of the Corrective Measures Study.

SPECIFIC COMMENTS

1. **Section 2.3 Investigation History, pages 2-2 through 2-4.**

   All documents listed in Sections 2.3.2, 2.3.3, and 2.3.4 must be included in the information repository that will be made available to the public during the public comment period for any proposed final remedy and associated permit modifications.

2. **Section 2.6.1 Bedrock Geology, page 2-5.**

   This section references Figure 2-5 which depicts the elevation of the bedrock in the area. Data that supports this depiction must be supplied as part of the report. GSRAD also suggests an alternate scenario for the development of the Florissant Basin. The basin may have developed in an old valley that drained north to the Missouri River in pre-Pleistocene time and was therefore occupied by a predecessor of the present Coldwater Creek. This section also includes a brief description of bedrock geology within the facility area. This description should include general permeability characteristics of the bedrock, including information regarding knowledge of fractures, the potential for fracturing, and any known karstic features in the area. The United States Army Corps of Engineers (USACE) has drilled into the limestone bedrock at the nearby St. Louis Airport Site (SLAPS) facility and knowledge they gained as a result may be beneficial in this regard.

3. **Section 2.6.2 Unconsolidated Materials, Lake Sediments, page 2-7.**

   According to GSRAD, the sequence of events leading up to the development of the Florissant Basin is slightly more complex than what is presented in the report. During the Pleistocene (Ice Age) the Mississippi River apparently became blocked by an ice dam moving from Illinois into Missouri near Chain-of-Rocks. This dam ponded water in the Mississippi and Missouri River Valleys to an elevation of about 550 feet above sea level and formed Lake Brussels. This also flooded the old northward draining valley now occupied by Coldwater Creek. In the still waters of the lake, thick sediments were deposited. In addition, the organic silt bed/horizon identified at various locations in the subsurface can be used as a stratigraphic marker, not all silt identified in the subsurface. Please add wording that indicates this is a distinct layer identified in the subsurface.

4. **Section 2.7.1 Limestone Bedrock, page 2-8.**

   The text indicates that the Miller reference states that just over 50 percent of the wells sampled yielded potable water, but the yield was highly variable. It is assumed that this is referring to the Post-Maquoketa Aquifer Group. The Kimmswick-Joachim Aquifer Group should also be considered in this section as it is also present at/near the site. In the latter group over 64 percent of wells sampled yielded potable water. Please identify the general location of the wells used in this study relative to the site, and the criteria used to

distinguish between high yield/low yield, and potable/nonpotable water. The information contained in the referenced document clearly indicates that some of the bedrock zones in and around the Boeing site represents potential sources of potable water. It seems unlikely, based on current site characterization information that releases to groundwater at the Boeing site would have impacted any potential bedrock aquifers capable of producing water. However, a comprehensive analysis of those factors bearing on current or potential future use of groundwater from such aquifers for domestic consumption has not been completed. In performing such an analysis, it appears unlikely that the deeper bedrock aquifers will "screen out" solely based on the quantity and quality of groundwater. This should be considered during Boeing's evaluation of the domestic consumption pathway for groundwater.

5. **Section 2.7.3 Surficial (Unconsolidated) Material, page 2-9.**

The report references Figure 2-11 when discussing the shallow and deep groundwater zones. This depiction of subsurface conditions identifies the silt layer as the dividing line between the shallow and deep zones. In almost all cases this silt layer was completely dry when it was encountered in borings at the site. A more representative depiction of the subsurface hydrology would include a shallow unit underlain by a very thick clay confining unit (the silt layer is within this confining unit) and a deep unit just above the bedrock. Water movement in the subsurface would be occurring in these two units with very little flow in or through the confining unit itself. Based on a review of the boring logs for MW-10 and 11, these wells do not appear to be screened in the more permeable deep unit. See Table 1 for drilling log summaries. Please revise the report accordingly.

Table 1 Deep Lithology

Well	Depth	Lithology
MW-5A-D	72' bgs	Rock zone 1-8" diameter chert and gravel, and limestone bedrock
MW-6D	74.5' bgs	.5' thick sandy gravel zone, and fine gravel to coarse sand in clay matrix
MW-8A-D	73' bgs	Poorly sorted gravel w/in highly plastic silty clay
MW-9D	72.5' bgs	Significant heave in augers, and water fills augers to near surface
MW-10D	74' bgs	Clayey silt, trace sand grains, and silty clay w/gravel-wet clay
MW-11D	54-75' bgs	Highly plastic clay, weathered shale, bedding planes, and shale bedrock
B41E1D	65' bgs	Pebble/gravel fracturing, and weathered rock
B4E2D	70' bgs	Gravel in clay, weathered gravels, and low moisture
B53W01D	93' bgs	Silty clay and gravel
B53W05D	83.5' bgs	Sand and limestone
B53W08D	92' bgs	Clayey gravel
HISS-05	97' bgs	No lithology on boring logs

6. Section 2.7.3.1 Shallow Groundwater Zone, page 2-9.

The report states that the results of the geochemical groundwater analysis conducted at the site are similar to that obtained by the USACE at the nearby SLAPS Facility. Please include the Corps' data in an appendix to support this statement.

7. Section 2.7.3.2 Deep Groundwater Zone, page 2-10.

The report states that there is limited, if any, interconnection between the shallow and deep groundwater zones at the site. One of the facts supporting this statement is the significant differences in the potentiometric levels between the two zones. In the vicinity of most well nests the deep zone has a higher potentiometric surface than the shallow zone. This is indicative, at the very least, of an upward hydraulic gradient, which would help prevent contamination from migrating deeper into the subsurface. However, this upward trend is not consistent across the site. In the vicinity of Hazelwood interim storage site (HISS)-05/D, MW-10S/D, and MW-11-S/D there appears to be a downward hydraulic gradient. A summary of the calculated hydraulic gradients is outlined in Table 2.

Table 2 Comparison of Nested Wells (Shallow and Deep) Vertical Gradients

Monitoring Wells		
Well Nest	**Vertical Gradient**	**Flow Direction**
	(feet/vertical foot)	
MW5-AS/MW5-AD	.04 - .08	Upward
MW8-AS/MW8-AD	.0005 - .05	Upward
MW-6/MW-6D	.005 - .05	Upward
MW-9S/MW-9D	.14 - .2	Upward
B53W01S/B5301D	.01 - .11	Upward
B53W05S/B5305D	.02 - .28	Upward
B53W08S/B5308D	.09 - .16	Upward
MW-10S/MW-10D	.02 - .04	Downward
MW-11S/MW-11D	.25 - .33	Downward
HISS-5/HISS-5D	Shallow WL is at a higher elevation	Downward

More discussion of the deeper unit will be necessary in the RFI Report. This should include the source(s) for the depiction of the bedrock geology in Figure 2-5, reasoning for the artesian conditions seen at MW-9D, and deep wells that are representative of the top of bedrock permeable zone. This information is important for determining potential major migration pathways for perchloroethylene (PCE)-related contamination at the site. It should also be noted that high concentrations of chlorinated solvents (such as those released as a result of the dripping pump handle at Solid Waste Management Unit (SWMU) 17) have a tendency to desiccate clays and can create their own conduits to migrate deeper into

the subsurface. Therefore, even though natural conditions indicate little interconnection between the hydrologic units, the deeper unit may have been impacted by the chlorinated solvent contamination through this mechanism.

At this time, there are two deep wells that have been impacted by chlorinated solvents. Directly east of SWMU 17 MW-11D has been sampled for over two years and trichyloroethylene (TCE) has consistently been detected at low levels. This well is completed at the top of the shale and the thickness of the underlying shale layer at this location is unknown. The other well impacted by chlorinated solvents is B41S3D in which PCE was detected at 125 µg/l. This well is completed at the top of limestone bedrock. Please revise the report to reflect this information.

8. Section 2.8.1 Groundwater Elevations, Deep Groundwater Zone, page 2-13.

The report states that the deep groundwater elevations vary considerably across the facility and SLAPS and indicate that the deep groundwater zone is not a continuous or well-defined hydrologic unit. The department agrees that this unit is not well defined, because there are not enough deep borings completed to define it. However, it may be premature to conclude that it is not continuous. The drilling logs indicate that MW-10D and MW-11D may not be screened in the deeper unit on top of limestone bedrock. Even though MW-9D water elevations are higher than the elevations in the deep SLAPS wells, the vertically upward groundwater flow gradient appears to be consistent with the vertical flow gradients observed at SLAPS. More effort must be made to develop a conceptual site model of the deep groundwater flow regime. A discussion related to the reasoning why deep zone potentiometric maps are not being generated will be necessary. This discussion should include a reasonable conclusion of the direction of deep groundwater flow supported by known geologic information, and a rationale for the discontinuity of deep water level information. This is important to assessing the potential migration of PCE related contamination in the deep zone.

9. Section 2.8.2 Hydraulic Conductivity, Pump Test, page 2-14.

The range of hydraulic conductivities measured at the site are compared to values for a glacial till ($8.8x10^{-5}$ to $9.3 x10^{-6}$cm/s). Since there are no glacial till deposits present at or near the facility it is unclear why this comparison is made other than a broad illustration of the material properties. Please explain this comparison or suggest a more appropriate one.

The horizontal hydraulic conductivity value calculated for MW-7S, screened in silty clay, is given as $2.4x10^{-4}$ cm/s. This value is on the upper end of the range expected for silts, but much higher than would be expected for clays. Because this monitoring well is set very near Building 52 and there is a subsurface structure present very near the pumping well

(19' deep concrete basin), the calculated hydraulic conductivity may not be representative of the silty clay unit. The fill surrounding the building and subsurface structure may have biased the hydraulic test rendering the test results inaccurate. Please explain how this may have affected the calculated values for hydraulic conductivity.

There is a reference to the SLAPS Data in which the geometric mean hydraulic conductivity for the shallow silty clay is given as 1.2×10^{-5} cm/s. This is an order of magnitude lower than that calculated in MW-7S. The average hydraulic conductivity at the Boeing facility is compared to the geometric mean hydraulic conductivity calculated at the nearby SLAPS Facility. The rationale behind comparing an arithmetic mean with a geometric mean should be discussed. It may be more appropriate to compare and contrast mean values of hydraulic conductivity than are calculated on a common basis.

10. Section 2.9 Surface Water-Coldwater Creek, page 2-16, 17.

The report states that the average annual flow rate of Coldwater Creek is 41 ft^3/s. Even though this flow rate may be an accurate annual average, it is not representative of creek conditions. Coldwater Creek receives stormwater runoff from a large urban area and is prone to flooding during and immediately following precipitation events. A more representative description of streamflow would include average low flows (baseflow), average high flows, and the annual average. The report also references the surface water and sediment samples collected from Coldwater Creek by the USACE and the United States Geological Survey (USGS). Pertinent subsets of this data should be included in the RFI Report to the extent that such data is being used by Boeing to formulate conclusions and recommendations relative to Coldwater Creek.

In 1997, a study was conducted on Coldwater Creek by USGS and one of the conclusions of that study was referenced in the RFI Report. This conclusion states that no measurable quantity of diffuse groundwater inflow could be detected along Coldwater Creek in the vicinity of the site. However, it was not mentioned that the minimum flow that could be identified was .01-.02 ft^3/s. This (.01 ft^3/s) is roughly equivalent to 6500 gallons/day. Inflow of groundwater to this creek would likely be much less than could be measured by the method used in the study. Other factors that imply that shallow groundwater does indeed discharge to the creek can be obtained by comparing water elevations in nearby shallow wells with the lowest elevation of the creek (505 feet amsl). Water elevations in MW-6 are consistently higher than the creek elevation (508-513 feet amsl). Surface water quality data collected as part of the USGS study identified increases in dissolved chromium and chlorinated solvents between the upstream sample (south of the airport) and samples collected near the Boeing facility.

A risk assessment completed by USACE for the SLAPS Facility is also referenced in this section. The Sera concluded that the metals or organic contaminants are ecological contaminant of potential concerns for one or more receptors in all media. It also concluded

that the non-radiological contamination identified in the creek (polyaromatic hydrocarbons (PAHs), Chromium) is not from the SLAPS or HISS site facilities. However, some of the contamination identified can be directly related to releases at the Boeing facility. This includes chromium, lead, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorine, naphthalene, phenanthrene, and pyrene. These PAHs are contaminants of concern for releases of diesel, fuel oils, and jet fuel. All of this information should be presented in more detail (i.e., surface water/sediment detections of Boeing contaminants of concern, eco-risk determinations), and all pertinent data should be included in the RFI Report to the extent that Boeing is relying on this information to form conclusions and recommendations for its site. See attached Table 2-5.

11. Section 4.1 Study Area A-Upgradient Parcel, page 4-1.

All three wells used for this study area were installed as clean upgradient wells; however, these wells may not be a representative of an impacted upgradient condition in this study area. Part of this property was historically used by Curtiss-Wright and DOD, yet there is no mention of this, or the historical activities conducted there in the RFI Report. Based upon all information that was submitted as part of the RFI, it appears that the only potential sources of contamination in this area are the former underground storage tanks (UST). There were six USTs in this area that were removed in 1989. A photo ionization detector (PID) was used to screen source area soil at four of the UST sites. At the other two UST sites, PID readings were taken ten feet north of one UST location and 20 feet west of the other. Because shallow groundwater flows in an east/southeasterly direction in this area, portions of Area A to the north and west should be considered upgradient. There is not enough information to conclude whether or not a release(s) has occurred. A discussion of the former USTs should be incorporated into this section along with the rationale for no further investigation in these areas.

Section 4.1.2 Investigation Results, Soil, page 4-1.

The report states that the results obtained from this area are not considered indicative of impacts, but they are likely due to natural or anthropogenic sources. This statement appears to be contradictory. Anthropogenic sources of impact is what the RFI is designed to determine. Please clarify what is meant by this statement.

12. Section 4.2 Study Area B-North Office Complex

Section 4.2.1.3 Investigation Results, Trash Compactor Hydraulic System, page 4-3.

The groundwater results from boring B220N1 identified total petroleum hydrocarbon (TPH) diesel range organics at a concentration of 35,000 µg/l, over three times the investigative threshold levels (ITL). No borings were completed directly downgradient

from this location, although B220N3 is somewhat downgradient. Please include more information about this source area that indicates the release was not more extensive.

Section 4.2.2.3 Investigation Results, Groundwater, page 4-4.

The groundwater results from boring B220I1 identified TCE at a concentration of 220 µg/l, and cis-1,2-dichloroethylene (DCE) at 54 µg/l. This boring was installed upgradient of the former vapor degreaser. The other two groundwater samples that were collected downgradient of this boring had much lower levels. B220I3 detected no contamination while MW-10S detected very low levels of cis-1,2-DCE (3 µg/l) and vinyl chloride (3 µg/l). Because the source area is known and there are borings completed downgradient from this source, it appears that the extent of this contamination has been adequately defined.

13. Section 4.3 Study Area C – GKN Area

Section 4.3.2 Division C(2), SWMU 8 Scrap Dock Shelter, page 4-6.

The report states that the department's HWP, Permits Section certified this unit as closed in 2001. However, it is not stated that the contamination identified in the area of this SWMU was deferred to the corrective action process and would be addressed as part of future site-wide corrective action activities. This acknowledgement should be added to the revised RFI Report.

Section 4.3.2.3 Investigation Results, Soil, page 4-8.

Boring B27W3 (eight foot bgs) detected TCE (390 µg/kg), cis-1,2-DCE (1800 µg/kg) and vinyl chloride (600 µg/kg) in soil. The suspected source for this contamination has not been identified, so it is unclear whether or not the source area has been adequately delineated. Boring B27I3 (12 foot bgs) is completed approximately 450 feet downgradient from this location. The TCE contamination in the north part of this division (RC1, RC3, RC6) is not adequately delineated to the east. RC7 was sampled at 16 foot bgs while all of the other samples were collected at eight bgs or less. A boring completed inside Building 27 (B27I1) detected TCE/daughters at 296 µg/kg at 12 foot bgs, and there are no borings between the recycle dock and the detections beneath Building 27 (RC7 sample was collected 16 foot bgs while RC1, 3, six were collected less than seven bgs). Boring RC-2 also detected TPH at 980,000 µg/kg (approximately five times the ITL) and it is unclear whether the extent has been defined.

Section 4.3.2.3 Investigation Results, Groundwater, page 4-8.

Groundwater results indicate the TCE-related contamination extends from RC2 south to B28MW4 and east to MW-5AS. Soil contamination may mimic this pattern, or there may be separate source areas. Identification of source areas and detailed descriptions should be included in the revised report.

The report discusses piezometers screened below the silt layer in clay that are considered to be intermediate between the shallow and deep zones. Actually these piezometers are set in the intermediate portion of the confining unit and represents contamination that has apparently penetrated this confining unit. Please revise as appropriate.

TPH was detected in groundwater at RC-2 (342,000 µg/l) and RC-3 (49, 000 µg/l). The source area for this contamination has not been identified or defined. The MW-9 well nest, which is located downgradient of RC-2 has never been sampled for TPH. Volatile organic compounds (VOC) were not elevated in the groundwater samples from RC-2 and RC-3, so a lack of VOC detections in MW-9S would not indicate that TPH contamination is not present. MW-9S should be sampled for TPH.

Section 4.3.3.3 Investigation Results, Soils, page 4-12.

TPH was detected above soil ITLs in four borings completed within Building 27 and east of the building. The suspected source for this contamination has not been identified and it is unclear if this contamination is from the same source or multiple sources. It is possible that contamination has migrated from the USTs west of the building using the storm sewer line as a conduit. The revised report should include a detailed discussion of potential sources for TPH in this area.

Section 4.3.3.3 Investigation Results, Groundwater, page 4-12.

The report suggests that the source of TCE contamination detected on the east side of the building is the plating shop industrial sewer. It is assumed that the leakage occurred where the sewer changes direction and/or at the sewer joints. It is unclear why TCE related contamination would be present in wastewater from a plating shop. Please explain this in more detail.

TPH was detected in groundwater above/near the ITL at borings B27I9 (120,000 µg/l), B27E2 (11,000 µg/l), B72I10 (8,000 µg/l), B27I7 (8500 µg/l), and B27I11 (7,000 µg/l). No groundwater sample was collected at B20E2, which had a very high TPH detection in soil (810 mg/kg). As with the soil data, source area identification is important when determining if the extent of impacts have been delineated. No information has been collected downgradient of sample B20E2 although B27E15 is somewhat downgradient.

14. Section 5.1 Study Area D –SWMU 17, page 5-1.

SWMU 2 Waste Nitric/Hydrofluoric Acid Storage, page 5-1.

This unit was closed in 2003. Closure information including sampling results should be included in the report.

Airport USTs, page 5-5.

The report discusses investigations conducted by the Airport on the land west of the Boeing property. A brief description of sample locations, monitoring well locations, and the data collected should be included in the RFI Report. This information is important in determining if off-site impacts are migrating onto the Boeing site.

Section 5.1.3 Investigation Results, Soil and Groundwater, pages 5-6 through 5-10.

The shallow subsurface (soil and groundwater) contamination at SWMU 17 appears to be adequately delineated. However, there are indications that the TPH contamination may be migrating on-site from the west. More investigation may be necessary to determine the extent of this on-site migration.

Deep groundwater impacts have not been determined including the potential existence of any free product at the unconsolidated material/bedrock interface. This investigation should be completed after any interim action has been completed at the shallow source area. A boring(s) installed beneath the source area, and depending on the results of this boring, a step out procedure may be necessary to delineate the deeper contamination.

15. Section 5.2 Study Area E, page 5-10.

Section 5.2.1.3 Jet Fuel Hydrant Area, Investigation Results, Soil/Groundwater, page 5-11.

TPH was detected in soil boring B48S11 (1377 mg/kg at three foot bgs). This sample was collected upgradient from the former break in the jet hydrant fuel line. Groundwater does not appear to be impacted at this location. The source for the soil contamination is unknown and the extent has not been defined. It should be noted that free product has historically been identified in nearby monitoring wells A10 and A12. There is a concern that the contamination may extend underneath the northeast corner of Building 45 thereby causing a potential indoor air threat. It is unclear if benzene detected at B48S8 (125 µg/kg at seven foot bgs) and TPH at B42W1 (158 mg/l) extends under Building 42. Further investigation may be necessary.

TPH was detected in soil at B42S2 (1020 mg/kg at five foot bgs) and at B42S6 (402 mg/kg at five bgs). Benzene was also detected in soil at B42S5 (63 µg/kg at eight bgs). Because

the TPH detection in groundwater at B42S5 (3,284 mg/l) is much higher than the TPH in B42S2 (16.5 mg/l), there may be a separate source for the contamination detected in B42S5 and B42S6. Two possibilities are the Hush House and the nearby former USTs (B33-B37). More investigation may be necessary to determine the source of this contamination.

The source of the Benzene/TPH contamination detected at B45S2 and B45S3 has not been identified. Based on the groundwater results, it appears that the former fuel pits are the source of this contamination. It is possible that impacts are greater closer to the former fuel pits. It should be noted that free product has historically been identified in the following monitoring wells: MW-A5, A14, A15, A22, A23, and A28. More investigation may be necessary.

PCE daughters were detected at B42N5 (cis-1,2-DCE, vinyl chloride) above ITLs. The source of this contamination has not been identified and it is unclear if it is related to SWMU 17 or Building 41 contamination. Cis-1,2-DCE was also detected in B42S4 but was not included in the analysis for most of the samples collected in the jet fuel line area. More investigation may be required to determine the source(s) of this contamination.

Section 5.2.2.3 Hush House, Investigation Results, Soil/Groundwater, page 5-14.

Free product has historically been detected in monitoring wells adjacent to the Hush House, and in 2003 free product was identified in monitoring wells A-1, A-3, and 3A. At this time, it appeared that the water elevation in the well was above the screened interval. This may prevent product from entering the wells. Two wells, MW-A2 and MW-A21, were not found in 2003. Based on the historical data, these wells may have been eliminated from the monitoring program too soon. In 1991, MW A-21 had 19,340 mg/l TPH and was never sampled again and MW A-2 had 6620 mg/l TPH and was sampled only once more. The wells that historically contained free product must be checked on a regular basis for water level elevation and the presence of free product.

Section 5.2.4.3 Industrial Sewer Line, Investigation Results, Soil/Groundwater, page 5-14.

The report states that sewer line repairs have been conducted along various piping sections. Please identify the sections that have been repaired in order to identify potential source/release areas. Further justification must be provided to determine if the metal exceedances are due to turbidity in the groundwater samples or represent mobile, dissolved phase metals.

Section 5.2.5.3 Building 41, Investigation Results, Soil/Groundwater, page 5-20.

PCE/daughters were not detected in shallow soil and there were only minor detections in

shallow groundwater (B41MW-5), yet PCE was detected in the deep zone at 125 µg/l (B41S3D). In this same area shallow PCE contamination appears minimal. The source for this deep contamination must be identified.

TPH-related constituents were detected in soil and groundwater at B41N1 (benzene, mineral spirits). A logical source for this contamination is the nearby tank farm/unloading area. A clean boring, B2N1, was installed approximately 250 foot downgradient of this location. However, the extent of the TPH contamination has not been defined.

Section 5.2.6.3 Building 1/2 USTs, Investigation Results, Soil/Groundwater, page 5-21.

TPH-related compounds were detected in soil and groundwater above ITLs near the former USTs B23 and B24. The extent of this contamination has not been defined and it is possible that contamination from UST B23 may extend beneath Building 1. More investigation may be necessary.

16. Section 5.4 Study Area G, page 5-25.

Section 5.4.2.1 Investigation Results, page 5-27.

Soil was impacted by TPH at boring S21B5 (293 mg/kg) and a water sample was not collected. The source for this contamination has not been identified nor has the extent been defined. If the wastewater treatment plant is the source, more investigation may be necessary to determine the extent of impact.

17. Section 6.1.2 Groundwater Metals Analysis, page 6-3.

The department has two primary concerns regarding metals in groundwater: Whether or not there has been a release(s) of metals (not naturally occurring) and if released, whether or not the metals have or are migrating in groundwater. Solubility of metals in water is affected by a variety of factors and these factors may vary across the site. Therefore, it is important to analyze for dissolved metals in all impacted areas to determine if there is any association with known releases and, if not, to demonstrate that the naturally occurring levels present are not problematic. Borings with apparently elevated metals in groundwater include B21S1, B22E2, B22E3, B22N1, B22W1, B27W2, B27W3, B28E1, HW1, RC2, RC4, RC7, RC10, B27E1, B27E3, B27E4, B27E6, B27E7, B27E8, B27E9, B27E10, B27E11, B27I1, B27I6, B27I7, B27I9, B27S1, B27S2, B42E2, B2N3, B2E2, and S21B1. A statistical analysis comparing clean upgradient wells with well in areas of suspected impact would help in this determination.

18. Volume 2 Tables.

It is unclear why specific volatile compounds are listed as not analyzed in many of the tables, (e.g., acetone, methyl ethyl ketone). If a sample was analyzed for VOCs, then all compounds would be detected if present. Please revise or explain in more detail.

19. Volume 3 Figures.

Figure 2-11 General Hydrogeologic Column.

As mentioned in a previous comment, the silt layer does not divide the shallow and deep groundwater. This figure should be revised to more accurately illustrate the two groundwater bearing units and the intervening confining unit.

Figures 4-5 and 4-6 Soil/Groundwater Detections.

The extent of contamination in these figures do not appear to be a conservative representation of site conditions. Known source areas are important when creating these depictions and it is also important to review all data including detections below ITLs. If separate sources are not present, then all contamination should be related to the known source area. When data is lacking, it is advisable to be conservative when drawing these depictions which would mean that contaminated areas should be depicted as connected if there is no information between the sampling locations which indicate that areas in-between are unimpacted. Please see the attached contaminant depictions created in environmental visualization system (EVS).

Figures 6-1 and 6-2 Soil/Groundwater Detections Above ITLs.

The extent of contamination in these figures do not appear to be a conservative representation of site conditions. Known source areas are important when creating these depictions and it is also important to review all data including detections below ITLs. If separate sources are not present, then all contamination should be related to the known source area. When data is lacking, it is advisable to be conservative when drawing these depictions which would mean that contaminated areas should be depicted as connected if there is no information between the sampling locations which indicate that areas in-between are unimpacted. Please see the attached contaminant depictions created in EVS.

Please submit three copies of a revised RFI Report and/or a response to the above comments within 30 days of receipt of this letter. If you have any questions concerning this comment letter or require any additional information, please do not hesitate to contact me at the Missouri Department of Natural Resources, HWP, P.O. Box 176, Jefferson City, MO 65102-0176, or by phone at (573) 751-3553.

Sincerely,

HAZARDOUS WASTE PROGRAM

Patrick Quinn, P.E.
Environmental Engineer
Permits Section

PQ:mj

c: Ms. Joletta Golik, Airport Authority
Mr. Jeremy Johnson, United States Environmental Protection Agency Region VII
St. Louis Regional Office